Sebago Technics
Engineering Expertise You Can Build On

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Ms. Kristi K. Eiane, Town Administrator
Town of Harpswell
P.O. Box 39
Harpswell, ME 04079-0039

Transmittal of Peer Review of FEMA Provisional Coastal Zone Flood Maps

Dear Kristi:

In accordance with our proposal of March 30, 2010, proposal (signed by you on April 8, 2010), Sebago Technics, Inc. (STI) has completed its evaluation of 23 specific FEMA wave transects that were used by FEMA to develop new provisional coastal zone flood maps for Harpswell.

We have used the 2-D wave model STWAVE3 to simulate the height and period of the "incident" waves to the selected FEMA wave transects and recalculated the "critical wave height" and wave runup at those transects from the revised incident wave characteristics, yielding a revised position of the VE-zone. We analyzed 23 transects out of the 41 analyzed by FEMA in Harpswell: 4, 5, 6, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 28, 31, 34, 35, 36, and 38.

Of all the municipalities we have worked for in these FEMA provisional map reviews, we have found some of the largest discrepancies between our recommended values and FEMA's flood elevations in the Town of Harpswell. The differences are due mostly to our use of the 3-D wave model STWAVE3 to propagate the 1% annual occurrence deep ocean wave to the transect sites. With all the islands, narrow inlets, and other complicated features of Harpswell's coastline, STWAVE3 shows a substantial reduction in the energy of the large offshore wave before it reaches most of the transects. For some of the long narrow coves where a wave was generated using a restricted fetch, our use of a lower wind velocity (52.3 mph versus 71 mph) makes a difference in addition to the use of the 3-D wave model and particularly since STWAVE3 takes into account water depth whereas the FEMA restricted fetch wave generation model assumes "deep" water where the bottom is deep enough not to reduce wave energy and wave height leading up to the transect. Although there are a couple transects where we actually calculate a flood elevation a few feet higher than FEMA, we in general calculated much lower flood elevations.

The attached detailed report is meant to be used in any appeal the Town may decide to take to FEMA once the new maps are re-posted to the 90-day municipal comment period. The report is technical and material in the Appendices may not be understood by many, but this is the kind of technical information that FEMA requires to be presented where their maps are challenged. In the main text of the report we have tried to describe the main processes involved in deriving coastal flood elevations under the new FEMA technical guidelines. Although we have tried to make the process descriptions generally understandable to a lay person, there is still much technical discussion that will not be understood by all. This is a very technically demanding

process with a lot of different procedures that must be followed in a certain order and in the end there is still an element of professional judgment where two equally qualified professionals may differ.

Finally, we note that the Harpswell shoreline is incredibly variable from point to point. Although any given wave transect may be relatively representative of the incoming wave height for that area, the high variability in offshore bathymetry and slope profile above high water in the runup zone may result in greatly different results in the height of the V-zone in only a short distance along the shoreline. Therefore, regardless of whatever final maps are approved by FEMA under these new procedures, there will be many locations in Harpswell where lower V-zones would undoubtedly be justified if detailed transect analysis were done at those particular locations. FEMA necessarily has to generalize and interpolate between transects, but there will be future opportunities for individual property owners to apply for Letters of Map Revision because of the particular circumstances at their locations.

Sincerely,

SEBAGO TECHNICS, INC.

Robert G. Gerber, P.E.
Vice President, Environmental Engineering

RGG:rgg/kn
Attachment: Final Report with DVD containing report PDF file, model input and output, and other backup calculations